Incidence of Revision Surgery Following Cervical Laminoplasty: A Systematic Review

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INTRODUCTION: Laminoplasty is a common procedure performed for multi-level cervical myelopathy (CM). It represents one of the three main surgical options for the treatment of CM, alongside anterior cervical decompression and fusion (ACDF) and laminectomy with fusion (LF). CLP, in comparison to LF, provides symptomatic relief through indirect decompression without a fusion. Thus, it preserves segmental motion. While prior literature has addressed the rate of revision surgery following cervical laminoplasty (CLP), there have been no systematic reviews to date focusing specifically on CLP. This systematic review identifies the percentage of revision surgeries among primary CLP procedures, while also denoting the reasons behind the need for revision.

METHODS: Following Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, an extensive literature search was performed utilizing PubMed, Embase, and Medline. Risk of bias was assessed by two authors independently. The quality of the studies was graded. The following outcomes measures were retrieved: the incidence of revision surgeries following CLP in adult patients, percentage of articles that provide information on reasons for revision surgery, and reasons for revision surgery.

RESULTS: The initial search included 2,976 studies total: PubMed (869), Embase (1577), and Medline (530). A total of 1,242 duplicates were removed, leaving 1,734 unique studies to screen. An evaluation of titles/abstracts followed by full-text assessment for eligibility resulted in the removal of 1,634 articles. The remaining 100 studies were included in the analysis. The average number of adults subjects included in each paper was 83±99 subjects with sample sizes ranging from 12 to 623 laminoplasties. The total number of laminoplasties extracted from the 100 included articles was 8,317. The average age was 60.1±4.6 years, and there was an average of 69.5% males in all the studies. The average follow-up was 3.9±3.8 years. A total of 179 revision surgeries were reported for the 8,317 index laminoplasties. The overall incidence rate for revision was 2.15%. The most common reasons for revision laminoplasty surgery were CM (23), disease progression (18), progression of OPLL (18), and radiculopathy (16). We further excluded acute, technique-related reoperations (31) (cord compression from lamina subsidence, post-laminoplasty hinge fracture, instrumentation failure, residual cervical stenosis, and technique-related failures) which gave a corrected revision rate of 1.78%.

DISCUSSION AND CONCLUSION:

CLP is an effective treatment for multi-level CM, yet limited information exists on revision rates following surgery. This systematic review aimed to provide insights into revision rates, reasons for revisions, and the demographics of patients requiring additional surgery after cervical laminoplasty. Our findings revealed a revision rate of 2.15%, with the most common reasons being myelopathy, radiculopathy, disease progression, and progression of OPLL. This revision rate should be considered with respect to those reported for ACDF and LF procedures. We recommend that spine surgeons use these findings to guide discussions and treatment planning with patients. Comparing potential revision rates across surgical interventions for CM highlights the importance of individualized decision-making, especially since CLP may be contraindicated in some cases of CM. Future research should continue to document revision rates and their causes, while also exploring the outcomes of revision surgeries to further inform surgical decision-making and patient care.

Figure 1. PRISMA flow chart.